

**REMARKS**

Claims 1-32 are pending and stand ready for further action on the merits. The newly added features to claims 1 and 13 find support in the specification at page 10, line 27 to page 11, line 2, page 4, lines 11-13, page 5, lines 9-17 and Figure 1. Support for new claims 23-24 can be found in claim 1. Support for new claims 25-26 can be found in claim 4. Support for new claim 27 can be found in claim 9. Support for claim 28 can be found in claim 12. Support for claim 29 can be found in claim 13. Support for claim 30 can be found in claim 17. Support for claims 31 and 32 can be found in claim 19.

No new matter has been added by way of the above-amendment.

The following sections correspond to the sections of the outstanding Office Action.

**Specification**

The Examiner objects to the specification for not clearly defining the terms "granulating means", "preliminary product" and "notched rods". Applicants respectfully traverse the objection.

Regarding "granulating means", Applicants direct the Examiner's attention to the specification at page 9, lines 17-18, wherein this term is defined as a component wherein the raw material is subject to shaping combined with pressing.

In addition, specific details of the construction of the granulating means is known in the art. For example, the Examiner's attention is directed to Killer (U.S. 6,186,426). Killer teaches that a mechanically de-watered slurry or the like is pressed through channels so that the slurry forms strands with periodically alternating areas of small and large cross sections being formed. This is then transported outside and split at locations exhibiting smaller cross sections. Applicants have provided the teachings of Killer for the Examiner's edification of some of the possible "granulating means", and the presently claimed invention is not limited thereto.

With regard to the terms "preliminary product" and "notched rods", the Examiner's attention is directed to the specification at page 14, lines 22-29. The "preliminary product" is defined as possibly being in the form of notched rods, wherein the rods are notched to enable their breakage as they drop into the fluidized bed for good distribution. It is also an embodiment of the invention to provide ball-like granules produced in another granulating means. However, the present invention is not limited to the ball-like granules and the notched rods as preliminary products. Accordingly, withdrawal of the objection is respectfully requested.

Claim Objections

The Examiner objects to claims 5-12 and 18-22 under 37 C.F.R. §1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. Applicants respectfully traverse the objection.

As the Examiner will note, Applicants have amended these claims to be in proper multiple dependent form. As such, withdrawal of the objection is respectfully requested.

Issues Under 35 U.S.C. §112, first paragraph

Claims 4, 7 and 19 are rejected under 35 U.S.C. §112, first paragraph. Applicants respectfully traverse the rejection.

With regard to the rejection of claims 4 and 19, the Examiner objects to the fact that these claims recite specific ranges for the granule diameters, which are not described in the specification. In response, Applicants have amended the specification at page 6, line 6 by inserting the granule diameters recited in claims 4 and 19.

The Examiner objects to claim 7, since "no discussion is made of how the already dried sludge is obtained or how it is introduced into the system." Applicants respectfully submit that the preparation of the initial dried sludge and how it is introduced into the system is not part of the invention. As such, it is not described in the specification. Also, a skilled artisan would understand that there are many ways in which the dried

sludge could be introduced into the system, including introduction through the feeding means (14). Another possibility is to stop the drying apparatus with granules inside. These granules are retained in the apparatus, and are used when the apparatus is next started. Obviously, the presently claimed invention is not limited to these examples, and the skilled artisan would readily find a means for introducing the already dried sludge into the system. A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991).

In view of the foregoing, Applicants respectfully submit that the subject matter of claims 4, 7 and 19 were described in the specification in such a way as to reasonably convey to the skilled artisan that the inventors, at the time the application was filed, had possession of the claimed invention. As such, withdrawal of the rejection is respectfully requested.

**Issues Under 35 U.S.C. §112, second paragraph**

Claims 1-22 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. Applicants respectfully traverse the rejection.

Applicants respectfully submit that the above amendment addresses each of the specific objections the Examiner has set forth in paragraphs numbered as 7-11 of the outstanding Office Action. The present claims particularly point out and distinctly

claim the subject matter which Applicant regards as the invention, and as such, withdrawal of the rejection is respectfully requested.

**Issues Under 35 U.S.C. §102 and §103**

Claims 1, 2, 13-15 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Rice et al. (U.S. Patent 5,596,815); **and** claims 3 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rice et al. in view of Yamato (U.S. Patent 3,815,255). Applicants respectfully traverse each of the rejections.

**Advantages of the Present Invention**

In the process according to the present invention, the raw material is mixed with the dried material in the fluidized bed, see claims 1 and 13. This is possible since the fluidized bed already contains granular particles in various stages of drying. Since a sufficient quantity of the dried granular material is present in the fluidized bed, the newly added material is able to pass through a sticky phase in a short amount of time thereby obviating the need to recycle the dried material. Due to mixing of the wet raw material with the dried granular material, there is an accelerated surface drying such that the concentration of the solids increases to more than 60%. This means that the wet

granular material risks adhering to the dry material for only a short period of time. The rapid drying or curing on the particle surface is achieved resulting in a granular material maintaining a stable shape with little adhesion to one another. See page 4, line 6 to page 5, line 17 of the specification.

The above-explanation has been provided to enable the Examiner to appreciate the patentable distinctions between the present invention and the teachings of the cited art.

Rice et al.

Rice et al. teach that when the raw material is so moist that it will stick together, a drying material is combined with the raw material *prior to* introduction to the granulating means (pelletizer). In the case where the moisture content is 20% or less, it is possible for the material to be dried without a "sticky phase" thereby enabling the process to be performed without the addition of dried material as shown in Figure 1 of Rice et al. (See also column 4, line 40 to column 5, line 7 and column 7, lines 1-15). However, if the concentration of the moisture is high, 50 to 70%, the raw material is mixed with the material that is already in a relatively dry state. Again, this mixing occurs *prior to* the pelletizer, see column 8, line 19 to column 10, line 11. In addition, if the moisture concentration is in the range of 95%, Rice et al. teach that the apparatus

requires an additional coagulator unit, as shown in Figure 5 (see also column 10, line 11 to column 11, line 52).

Thus, the presently claimed invention is patentably distinct from the process of Rice et al., since Rice et al. requires the addition of the dry material to the wet raw material prior to the granulating means, whereas the presently claimed invention mixes the wet raw material with pre-dried material which is present in the fluidized bed. The inventive mixing is performed in the fluidized bed and occurs after the wet raw material has been passed through the granulating means. Since the initial sticky phase is rapidly passed through in the drying container/fluidized bed, the present process has the advantage of omitting recycling of the dried material. There is an accelerated surface drying such that the concentration of the solids reaches higher than 60% in a very short period. This rapid drying or curing of the particle surface results in a granular material maintaining a stable shape with little adhesion to one another. Thus, significant patentable distinctions exist between the disclosure of Rice et al. and the presently claimed invention.

Yamato

The Examiner, aware of the deficiencies of Rice et al., cites Yamato in order to cure those deficiencies. Applicants respectfully submit that Yamato do not cure the deficiencies of Rice et al.

The Examiner cites Yamato for teaching "a fluidized bed dryer for sludges and other materials wherein material is introduced in the bottom of the fluid bed, and is conveyed across the surface to reduce agglomeration in the 'sticky phase' (Figure 9 and column 1)."

Applicants respectfully submit that Yamato fails to teach or suggest mixing the just produced granules with previously dried granules within the fluidized bed.

Accordingly, Yamato fails to cure the deficiencies of Rice et al.

As the MPEP directs, all claim limitations must be taught or suggested by the prior art to establish a *prima facie* case of anticipation or obviousness, see MPEP §§ 2131 and 2143.03. Accordingly, withdrawal of each of the rejections is respectfully requested.

#### Conclusion

In view of the above amendments and comments, Applicants respectfully submit that the claims are in condition for allowance. A notice to such effect is earnestly solicited.

Applicants have attached hereto a marked up version of the claims to show the changes made for the Examiner's convenience.

If the Examiner has any questions concerning this application, he is requested to contact the Garth M. Dahlen, Ph.D. (#43,575) at the offices of Birch, Stewart, Kolasch & Birch, LLP.



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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made  
Copy of Killer U.S. 6,186,426

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification has been amended as follows:

The paragraph beginning on page 5, line 33 to page 6, line 6 has been amended as follows:

--Size and shape of the dried granular material may be influenced by using various types of granulators and by varying the operating parameters during grain conformation. Hereby a narrow grain size distribution at grain diameters of a few millimeters and adaptation to the specific application and to customers' specifications are achieved, e.g. for use in [fertiliser] fertilizer spreaders or for [pressurised] pressurized air injection in combustion facilities. The granular material has granules which are preferably 1-10 mm in average diameter, more preferably 3 to 7 mm and most preferably about 5 mm.--

IN THE CLAIMS:

The claims have been amended as follows:

Claim 1. (Amended) A process for continuously drying protein-containing sludge[, in particular sewage sludge,] in a [fluidised] fluidized bed (20) through which a drying gas flows,

wherein partially de-watered sludge (6) is added to the  
[fluidised] fluidized bed (20) in granulate form (21) and dried  
sludge (10) is removed therefrom,  
[characterized in that] wherein

the granules are formed without the addition of dried  
substances [and the granulating process is preferably combined  
with pressing] and are applied to the fluidized bed (20)  
immediately following their production and are mixed with  
granular particles throughout various stages of drying contained  
in the fluidized bed.

Claim 2. (Amended) The process according to claim 1,  
[characterized in that] wherein the granular material (21) or a  
preliminary product thereof is applied onto the [fluidised]  
fluidized bed (20) immediately following its production and by  
gravity.

Claim 3. (Amended) The process according to claim 1,  
[characterized in that] wherein the granular material (21) or a  
preliminary product thereof is introduced directly into the  
[fluidised] fluidized bed (20) below the surface (20a) thereof.

Claim 4. (Amended) The process according to any one of  
claims 1 to 3, [characterized in that] wherein the [applied]

granules (21) [are used while having] have an average diameter in the range of 1 to 10 mm[, preferably 3 to 7 mm, in particular about 5 mm].

Claim 5. (Amended) The process according to [any of claims 1 to 4, characterized in that] claim 1, wherein the partially de-watered sludge (6) is dried to have a dry [substances] substance content of at least 90% of the mass of the dried product.

Claim 6. (Amended) The process according to [any one of claim 1 to 5, characterized in that] claim 1, wherein superheated water vapor is used as a drying gas.

Claim 7. (Amended) The process according to [any of claims 1 o 6, characterized in that] claim 1, wherein the process start-up is carried out by using a [fluidised] fluidized bed (20) of already dried sludge (10) in granulate form.

Claim 8. (Amended) The process according to [any one of claims 1 to 7, characterized in that] claim 1, wherein the [fluidised] fluidized bed (20) is heated by means of a heat exchanger (16).

Claim 9. (Amended) The process according to claim 8, [characterized in that] wherein saturated steam having a pressure above atmospheric [of preferably to 25 bar] is used as a heating medium for the heat exchanger (16).

Claim 10. (Amended) The process according to [any one of claims 1 to 9, characterized in that] claim 1, wherein drying is performed at a pressure slightly above atmospheric pressure.

Claim 11. (Amended) The process according to [any one of claims 1 to 9, characterized in that] claim 1, wherein drying is performed at a pressure slightly below atmospheric pressure.

Claim 12. (Amended) The process according to [any one of claims 1 to 11, characterized in that the] claim 1, wherein exhaust vapor expelled from the dried sludge (10) is compressed and condensed under the pressure elevated as a result of compression[, preferably in the heat exchanger (16) accommodated in the fluidized bed (20)].

Claim 13. (Amended) A device for continuously drying protein-containing sludge[, in particular sewage sludge,] in a [fluidised] fluidized bed (20), comprising a drying container (13) which includes a lower receiving

chamber (18) for drying gas and a gas-permeable support (19) for the [fluidised] fluidized bed (20),

[means] a feeding component (14) for feeding [the] partially de-watered sludge (6)

and [means] a withdrawing component (17) for withdrawing the dried sludge (10),

said feeding [means] component (14) [including] having a granulating [means] component (14a) adapted to apply the produced granules immediately to the fluidized bed (20) in which the granules are mixed with granular particles throughout the various stages of drying contained in the fluidized bed (20), and

[characterized in that]

said feeding [means] component (14) [do] does not include a means for admixing dried substances.

Claim 14. (Amended) The device according to claim 13, [characterized in that the] wherein an outlet [range] (22) of the granulating [means] component (14a) is positioned adjacent to, or inside, the peripheral wall of the drying container (13) and above the [means] gas permeable support (19) [supporting the fluidized bed (20)].

Claim 15. (Amended) The device according to claim 14, [characterized in that] wherein the outlet [range] (22) of the granulating [means] component (14a) is positioned above [the] a surface of the [fluidised] fluidized bed (20a).

Claim 16. (Amended) The device according to claim 14, [characterized in that] wherein the outlet [range] (22) of the granulating [means] component (14a) is positioned below [the] a surface (20a) of the [fluidised] fluidized bed.

Claim 17. (Amended) The device according to any one of claims 13 to 16, [characterized in that] wherein the granulating [means] component (14a) [are] is adapted to form a preliminary product of the granular material (21) [, e.g. having the form of notched rods].

Claim 18. (Amended) The device according to [any one of claim 13 to 17, characterized in that] claim 13, wherein the granulating [means] component (14a) subjects [subject the] granules to pressing forces during [the] a granulating [process] step.

Claim 19. (Amended) The device according to [any one of claims 13 to 18, characterized in that] claim 18, wherein the

[applied] granules (21) [present] have an average [diameters] diameter in the range of 1 to 10 mm[, preferably 3 to 7 mm, in particular about 5 mm].

Claim 20. (Amended) The device according to [any one of claims 13 to 19, characterized in that] claim 13, wherein at least one heat exchanger (16) is present in the [fluidised] fluidized bed (20) and includes heat exchanger surfaces onto which the material of the [fluidised] fluidized bed (20) may be applied.

Claim 21. (Amended) The device according to [any one of claim 13 to 20, characterized in that] claim 13, wherein the drying container (13) is adapted to be pressure-tight.

Claim 22. (Amended) The device according to [any one of claims 13 to 21, characterized in that] claim 13, further comprising a component for recuperating heat energy from expelled exhaust gas, wherein said component comprises a compressor and a condenser[, for heat recuperation of the heat energy contained in the expelled exhaust vapor].

Claims 23-32 have been added.